

DEPARTMENT OF TRANSPORTATION**National Highway Traffic Safety Administration****49 CFR Part 533****[Docket No. 2003-16709]****RIN 2127-AJ26****Reforming the Automobile Fuel Economy Standards Program; Request for Product Plan Information**

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

ACTION: Request for Comments

SUMMARY: The purpose of this request for comments is to acquire information regarding vehicle manufacturers' future product plans to assist the agency in analyzing possible reforms to the corporate average fuel economy (CAFE) program which are discussed in a companion notice published today. The agency is seeking information that will help it assess the effect of these possible reforms on fuel economy, manufacturers, consumers, the economy, motor vehicle safety and American jobs.

DATE: Comments must be received on or before **[insert date 120 days after publication in the Federal Register]**.

ADDRESSES: You may submit comments [identified by DOT DMS Docket Number 2003-16709] by any of the following methods:

- Web Site: <<http://dms.dot.gov>>. Follow the instructions for submitting comments on the DOT electronic docket site.
- Fax: 1-202-493-2251.
- Mail: Docket Management Facility; US Department of Transportation, 400 Seventh Street, SW, Nassif Building, Room PL-401, Washington, DC 20590-001.

- Hand Delivery: Room PL-401 on the plaza level of the Nassif Building, 400 Seventh Street, SW, Washington, DC, between 9 am and 5 pm, Monday through Friday, except Federal Holidays.
- Federal eRulemaking Portal: Go to <<http://www.regulations.gov>>. Follow the online instructions for submitting comments.

FOR FURTHER INFORMATION CONTACT: For non-legal issues, call Ken Katz, Lead Engineer, Fuel Economy Division, Office of Planning and Consumer Standards, at (202) 366-0846, facsimile (202) 493-2290, electronic mail kkatz@nhtsa.dot.gov. For legal issues, call Otto Matheke, Office of the Chief Counsel, at (202) 366-5263, electronic mail omatheke@nhtsa.dot.gov.

SUPPLEMENTARY INFORMATION:

I. Introduction

In a companion document, an advanced notice of proposed rulemaking, published today in the *Federal Register*, NHTSA is seeking comments relating to possible enhancements and reforms to the CAFE program that will assist in furthering fuel conservation, while protecting motor vehicle safety and American jobs. To assist the agency in analyzing possible reforms to the CAFE program, in addition to the questions found in the body of the advanced notice of proposed rulemaking, NHTSA has included a number of additional questions, found in an appendix to this notice, directed primarily toward vehicle manufacturers.

The appendix requests information from manufacturers regarding their product plans from MY 2003 through MY 2012, and the assumptions underlying those plans. The agency would appreciate answers that are as responsive as possible so that the agency can analyze the impact of the reforms on the entire industry. Because some of the possible reforms may change the distinction between passenger cars and light trucks, the

agency is requesting data from manufacturers for both their passenger car plans AND their light truck plans.

In an attempt to assure conformity in data submittal and to assist manufacturers with supplying information to the agency regarding their product plans from MY 2003 through MY 2012, NHTSA has developed spreadsheet templates for manufacturers' use. These templates are the preferred format for data submittal, and can be found on the agency's CAFE website at: <http://www.nhtsa.dot.gov/cars/rules/CAFE/rulemaking.htm>. The Appendix also includes sample tables that manufacturers should refer to when submitting their data to the Agency.

II. Public Participation

Interested persons are invited to comment in response to this request for comments. It is requested, but not required, that two copies be submitted to the Office of Docket Management, Room PL-401, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590.

Your comments must be written and in English. To ensure that your comments are correctly filed in the Docket, please include the docket number of this document in your comments. All comments must be limited to 15 pages in length. Necessary attachments may be appended to those submissions without regard to the 15-page limit (49 CFR 553.21). This limitation is intended to encourage commenters to detail their primary arguments in a concise fashion.

Written comments to the public docket must be received by **[insert date 120 days after publication]**.

All comments received before the close of business on the comment closing date will be considered and will be available for examination in the docket at the above address before and after that date. To the extent possible, comments filed after the

closing date will also be considered. However, the rulemaking action may proceed at any time after that date. NHTSA will continue to file relevant material in the docket as it becomes available after the closing date, and it is recommended that interested persons continue to examine the docket for new material.

Please submit two copies of your comments, including the attachments, to Docket Management at the address given above under ADDRESS.

Comments may also be submitted to the docket electronically by logging onto the Dockets Management System website at <http://dms.dot.gov>. Click on "Help & Information" or "Help/Info" to obtain instructions for filing the document electronically.

If you wish Docket Management to notify you upon its receipt of your comments, enclose a self-addressed, stamped postcard in the envelope containing your comments. Upon receiving your comments, Docket Management will return the postcard by mail.

If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Chief Counsel, NHTSA, at the address given above under FOR FURTHER INFORMATION CONTACT. In addition, you should submit two copies, from which you have deleted the claimed confidential business information, to Docket Management at the address given above under ADDRESS. If you submit a computer disk containing your confidential plans, please submit only one copy. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation. (49 CFR Part 512.) If you submit both a hard copy and a computer disk containing confidential business information, please include a separate cover letter for each submission.

III. Regulatory Analyses and Notices

Executive Order 12866 and DOT Regulatory Policies and Procedures

NHTSA has considered the potential impacts of this request for comments under Executive Order 12866 and the Department of Transportation's regulatory policies and procedures. This document has been determined to be nonsignificant under the Department's regulatory policies and procedures.

This document seeks information regarding future manufacturer product plans, capabilities and costs in order to assess potential changes to the agency's regulations relating to Corporate Average Fuel Economy, including potential changes to vehicle classification and to the fuel economy standards applicable to those vehicles. The agency could take a variety of regulatory actions regarding these issues. Further, this agency has not identified any regulatory actions sufficiently likely to warrant calculation of possible benefits and costs. If NHTSA were to initiate rulemaking and develop a rulemaking proposal, the agency would calculate the costs and benefits associated with the specific proposal and place its analysis in the docket for that proposal. The agency would also conduct the various other rulemaking analyses required by applicable statutes and Executive Orders.

NHTSA will reassess this rulemaking in relation to the Executive Order, the DOT Regulatory Policies and Procedures, the Unfunded Mandates Reform Act of 1995 and other requirements for analyzing rulemaking impacts if, after using the information received in response to this request for comments, the agency decides to issue a proposal to amend its current regulations.

Authority: 15 U.S.C. 2002; delegation of authority at 49 CFR 1.50.

Issued on:

Stephen R. Kratzke
Associate Administrator
For Rulemaking

Billing Code: 4910-59-P

[Signature page for RIN 2127-AJ26; Request for comments]

APPENDIX

I. Definitions

As used in this appendix--

1. "Automobile," "fuel economy," "manufacturer," and "model year," have the meaning given them in Section 32901 of Chapter 329 of Title 49 of the United States Code, 49 U.S.C. 32901.
2. "Cargo-carrying volume," "gross vehicle weight rating" (GVWR), and "passenger-carrying volume" are used as defined in 49 CFR 523.2.
3. "Basic engine" has the meaning given in 40 CFR 600.002-85(a)(21). When identifying a basic engine, respondent should provide the following information:
 - (i) Engine displacement (in liters). If the engine has variable displacement (i.e., cylinder deactivation) the respondent should provide both the minimum and maximum engine displacement.
 - (ii) Number of cylinders or rotors.
 - (iii) Number of valves per cylinder.
 - (iv) Cylinder configuration (V, in-line, etc.).
 - (v) Other engine characteristics, abbreviated as follows:
 - DI - Direct Injection
 - ID - Indirect Injection
 - MPFI - Multipoint Fuel Injection S.I.
 - PFI – Port Fuel Injection
 - SEFI – Sequential Electronic Fuel Injection
 - TBI – Throttle Body Fuel Injection
 - T - Turbocharged
 - S - Supercharged
 - FFS - Feedback Fuel System
 - 2C – Two-stroke engines
 - OHV – Overhead valve
 - SOHC - Single overhead camshaft
 - DOHC - Dual overhead camshafts
 - VVT - Variable valve timing
 - VVLT – Variable valve lift and timing
 - CYDA – Cylinder deactivation

IVT – Intake valve throttling

CVA – Camless valve actuation

VCR – Variable compression ratio

LBFB – lean burn-fast burn combustion

4. "Domestically manufactured" is used as defined in Section 32904(b)(2) of Chapter 329, 49 U.S.C. 32904(b)(2).
5. "Passenger car" means an automobile of the type described in 49 CFR Part 523.3 and 523.4.
6. A "model" of passenger car is a line, such as the Chevrolet Impala, Ford Taurus, Honda Accord, etc., which exists within a manufacturer's fleet.
7. "Model Type" is used as defined in 40 CFR 600.002-85(a)(19).
8. "Percent fuel economy improvements" means that percentage which corresponds to the amount by which respondent could improve the fuel economy of vehicles in a given model or class through the application of a specified technology, averaged over all vehicles of that model or in that class which feasibly could use the technology.
Projections of percent fuel economy improvement should be based on the assumption of maximum efforts by respondent to achieve the highest possible fuel economy increase through the application of the technology. The baseline for determination of percent fuel economy improvement is the level of technology and vehicle performance with respect to acceleration and gradeability for respondent's 2003 model year passenger cars in the equivalent class.
9. "Percent production implementation rate" means that percentage which corresponds to the maximum number of passenger cars of a specified class, which could feasibly employ a given type of technology if respondent made maximum efforts to apply the technology by a specified model year.
10. "Production percentage" means the percent of respondent's passenger cars of a specified model projected to be manufactured in a specified model year.
11. "Project" or "projection" refers to the best estimates made by respondent, whether or not based on less than certain information.
12. "Redesign" means any change, or combination of changes, to a vehicle that would change its weight by 50 pounds or more or change its frontal area or aerodynamic drag coefficient by 2 percent or more.

13. "Relating to" means constituting, defining, containing, explaining, embodying, reflecting, identifying, stating, referring to, dealing with, or in any way pertaining to.
14. "Respondent" means each manufacturer (including all its divisions) providing answers to the questions set forth in this appendix, and its officers, employees, agents or servants.
15. "Test Weight" is used as defined in 40 CFR 86.082-2.
16. "Transmission class" is used as defined in 40 CFR 600.002-85(a)(22). When identifying a transmission class, respondent also must indicate whether the type of transmission, and whether it is equipped with a lockup torque converter (LUTC), a split torque converter (STC), and/or a wide gear ratio range (WR) and specify the number of forward gears or whether the transmissions a continuously variable design (CVT). If the transmission is of a hybrid type, that should also be indicated.
17. "Truckline" means the name assigned by the Environmental Protection Agency to a different group of vehicles within a make or car division in accordance with that agency's 2001 model year pickup, van (cargo vans and passenger vans are considered separate truck lines), and special purpose vehicle criteria.
18. "Variants of existing engines" means versions of an existing basic engine that differ from that engine in terms of displacement, method of aspiration, induction system or that weigh at least 25 pounds more or less than that engine.

II. Assumptions

All assumptions concerning emission standards, damageability regulations, safety standards, etc., should be listed and described in detail by the respondent.

III. Specifications – Passenger Car Data

Go to www.nhtsa.dot.gov/cars/rules/CAFE/rulemaking.htm for spreadsheet templates.

1. Identify all passenger car models offered for sale in MY 2003 whose production you project discontinuing before MY 2008 and identify the last model year in which each will be offered.
2. Identify all basic engines offered by respondent in MY 2003 passenger cars which respondent projects it will cease to offer for sale in passenger cars before MY 2008, and identify the last model year in which each will be offered.

3. For each model year 2003-2012, list all projected passenger car model types and provide the information specified below for each model type. Model types that are essentially identical except for their nameplates (e.g., Chrysler Sebring/Dodge Stratus) may be combined into one item. Engines having the same displacement but belonging to different engine families are to be grouped separately. Separate tables should be provided for domestic and import passenger car fleets. Within a domestic or import passenger car fleet, the vehicles are to be sorted first by passenger car line, second by basic engine, and third by transmission type. Spreadsheet templates can be found at www.nhtsa.dot.gov/cars/rules/CAFE/rulemaking.htm. These templates include codes and definitions for the data that the Agency is seeking.

a. General Information

1. A unique identifying number or code assigned to each model.
2. Vehicle manufacturer.
3. Vehicle model (e.g., Camry)
4. Vehicle nameplate (e.g., Camry Solara)
5. Weighted average fuel economy
6. Engine code
 - (a) Engine manufacturer
 - (b) Engine name
 - (c) Engine's country of origin
 - (d) Fuel
 - (e) Engine oil viscosity
 - (f) Combustion cycle
 - (g) Air/fuel ratio
 - (h) Fuel system
 - (i) Aspiration
 - (j) Valvetrain design
 - (k) Valve actuation/timing
 - (l) Valve lift
 - (m) Number of engine cylinders
 - (n) Configuration
 - (o) Valves per cylinder
 - (p) Cylinder deactivation

- (q) Engine displacement
- (r) Compression ratio (Min)
- (s) Compression ratio (Max)
- (t) Horsepower
- (u) Torque

7. Transmission code

- (a) Transmission manufacturer
- (b) Name of transmission
- (c) Transmission's country of origin
- (d) Transmission type
- (e) Number of forward gears
- (f) Control
- (g) Logic
- (h) Gear ratios for all forward gears
- (i) Reverse gear ratio
- (j) Torque converter ratio
- (k) Axle ratio
- (l) Torque converter lockup/bypass status
- (m) Transmission fluid specification
- (n) Transmission lubricant viscosity

8. Domestic or Import

b. Projected U.S. sales

c. Vehicle information

1. Style (e.g., convertible, sedan, coupe)
2. EPA Size Class
3. Construction (e.g., Unibody, ladder)
4. Drive (e.g., rear wheel drive, front wheel drive, all-wheel drive, 4-wheel drive)
5. Final drive ratio
6. N/V
7. Front axle lubricant viscosity
8. Rear axle lubricant viscosity
9. Overall length (per code L103 of SAE J1100, revised July 2002)

10. Overall width (per code W116 of SAE J1100, revised July 2002)
11. Overall height (per code H100 of SAE J1100, revised July 2002)
12. Wheelbase (per code L101 of SAE J1100, revised July 2002)
13. Track width (front) (per code W101-1 of SAE J1100, revised July 2002)
14. Track width (rear) (per code W101-2 of SAE J1100, revised July 2002)
15. Ground clearance (per 49 CFR 323.5)
16. Front axle clearance (per 49 CFR 323.5)
17. Rear axle clearance (per 49 CFR 323.5)
18. Angle of approach (per 49 CFR 323.5)
19. Breakover angle (per 49 CFR 323.5)
20. Angle of departure (per 49 CFR 323.5)
21. Height of the center of gravity (per NCAP Static Stability Factor procedures)
22. Curb weight, in lbs.
23. Test weight, in lbs.
24. Power absorption unit setting, in horsepower
25. Gross Vehicle Weight Rating, in lbs.
26. Towing capacity (standard), in lbs.
27. Towing capacity (maximum), in lbs.
28. Payload, in lbs.
29. Minimum designated seating positions
30. Maximum designated seating positions
31. Designated seating positions in the first row
32. Cargo volume behind the front row in ft³ (per Table 28 of SAE J1100, revised July 2002)
33. Designated seating positions in the second row
34. Capability of second row seats to fold flat
35. Cargo volume behind the second row in ft³ (per Table 28 of SAE J1100, revised July 2002)
36. Designated seating positions in the third row
37. Capability of third row seats to fold flat
38. Cargo volume behind the third row in ft³ (per Table 28 of SAE J1100, revised July 2002)
39. Enclosed volume in ft³

40. Passenger volume in ft³ (The volume measured using SAE Recommended Practice J1100 as per EPA Fuel economy regulations, reg. 40 CFR 600.315-82 "Classes of Comparable Automobiles." This number is what automobile manufacturers calculate and submit to EPA.)
 41. Cargo volume index (per Table 28 of SAE J1100, revised July 2002)
 42. Open box length (per L506 of SAE J1100, revised July 2002)
 43. Open box width (min) (per W201 of SAE J1100, revised July 2002)
 44. Open box width (max) (per W500 of SAE J1100, revised July 2002)
 45. Open box area
 46. Open box height (per H503 of SAE J1100, revised July 2002)
 47. Fuel capacity in gallons
 48. Tire rolling resistance, Crr
 49. Frontal area
 50. Aerodynamic drag coefficient, Cd
- d. Hybridization
1. Type
 2. Voltage or pressure
 3. Energy storage capacity, in MJ
 4. Battery type
 5. Energy transfer
 6. Percentage of braking energy recovered and stored
 7. Percentage of maximum motive power provided by stored energy system
- e. Planning and assembly
1. Predecessor model
 2. Last freshening
 3. Next freshening
 4. Last redesign
 5. Next redesign
 6. Domestic content
 7. Final assembly city
 8. Final assembly state
 9. Final assembly country
- f. Manufacturers' suggested retail price (in constant 2003 dollars)

g. Emissions

1. EPA class (LDV, LLDT, HLDT, MDPV)
2. EPA certification bin
3. LEV class

The agency also requests that each manufacturer provide an estimate of its overall domestic and passenger car CAFE for each model year. This estimate should be included as an entry in the spreadsheets that are submitted to the agency.

4. Does respondent project introducing any variants of existing basic engines or any new basic engines, other than those mentioned in your response to Question 3, in its passenger car fleets in MYs 2003-2012? If so, for each basic engine or variant indicate:

- a. The projected year of introduction.
- b. Type (e.g., spark ignition, direct injection diesel, 2-cycle, alternative fuel use).
- c. Displacement. (If engine has variable displacement, please provide the minimum and maximum displacement)
- d. Type of induction system (e.g., fuel injection with turbocharger, naturally aspirated).
- e. Cylinder configuration (e.g., V-8, V-6, I-4).
- f. Number of valves per cylinder (e.g., 2, 3, 4).
- g. Valvetrain Design (e.g., overhead valve, overhead camshaft,
- h. Valve technology (e.g., variable valve timing, variable valve lift and timing, intake valve throttling, camless valve actuation, etc.)
- i. Horsepower and torque ratings,
- j. Models in which engines are to be used, giving the introduction model year for each model if different from "a," above.

5. Relative to MY 2003 levels, for MYs 2005-2012, please provide information, by model and as an average effect on a manufacturer's entire passenger car fleet, on the weight and/or fuel economy impacts of the following standards or equipment:

- a. Federal Motor Vehicle Safety Standard (FMVSS 208) Automatic Restraints
- b. FMVSS 201 Occupant Protection in Interior Impact
- c. Voluntary installation of safety equipment (e.g., antilock brakes)
- d. Environmental Protection Agency regulations
- e. California Air Resources Board requirements
- f. Other applicable motor vehicle regulations affecting fuel economy.

6. For each of the model years 2003-2012, and for each passenger car model projected to be manufactured by respondent (if answers differ for the various models), provide the requested information on new technology applications for each of items "6a" through "6r" listed below:

- (i) description of the nature of the technological improvement;
- (ii) the percent fuel economy improvement averaged over the model;
- (iii) the basis for your answer to 6(ii), (e.g., data from dynamometer tests conducted by respondent, engineering analysis, computer simulation, reports of test by others);
- (iv) the percent production implementation rate and the reasons limiting the implementation rate;
- (v) a description of the 2003 baseline technologies and the 2003 implementation rate; and
- (vi) the reasons for differing answers you provide to items (ii) and (iv) for different models in each model year. Include as a part of your answer to 6(ii) and 6(iv) a tabular presentation, a sample portion of which is shown in Table III-A.

- a. Improved automatic transmissions. Projections of percent fuel economy improvements should include benefits of lock-up or bypassed torque converters, electronic control of shift points and torque converter lock-up, and other measures which should be described.
- b. Improved manual transmissions. Projections of percent of fuel economy improvement should include the benefits of increasing mechanical efficiency, using improved transmission lubricants, and other measures (specify).
- c. Overdrive transmissions. If not covered in "a" or "b" above, project the percentage of fuel economy improvement attributable to overdrive transmissions (integral or auxiliary gear boxes), two-speed axles, or other similar devices intended to increase the range of available gear ratios. Describe the devices to be used and the application by model, engine, axle ratio, etc.
- d. Use of engine crankcase lubricants of lower viscosity or with additives to improve friction characteristics or accelerate engine break-in, or otherwise improved lubricants to lower engine friction horsepower. When describing the 2003 baseline, specify the viscosity of and any fuel economy-improving additives used in the factory-fill lubricants.
- e. Reduction of engine parasitic losses through improvement of engine-driven accessories or accessory drives. Typical engine-driven accessories include water pump,

cooling fan, alternator, power steering pump, air conditioning compressor, and vacuum pump.

- f. Reduction of tire rolling losses, through changes in inflation pressure, use of materials or constructions with less hysteresis, geometry changes (e.g., reduced aspect ratio), reduction in sidewall and tread deflection, and other methods. When describing the 2003 baseline, include a description of the tire types used and the percent usage rate of each type.
 - g. Reduction in other driveline losses, including losses in the non-powered wheels, the differential assembly, wheel bearings, universal joints, brake drag losses, use of improved lubricants in the differential and wheel bearing, and optimizing suspension geometry (e.g., to minimize tire scrubbing loss).
 - h. Reduction of aerodynamic drag.
 - i. Turbocharging or supercharging.
 - j. Improvements in the efficiency of 4-cycle spark ignition engines including (1) increased compression ratio; (2) leaner air-to-fuel ratio; (3) revised combustion chamber configuration; (4) fuel injection; (5) electronic fuel metering; (6) interactive electronic control of engine operating parameters (spark advance, exhaust gas recirculation, air-to-fuel ratio); (8) variable valve timing or valve lift; (9) multiple valves per cylinder; (10) cylinder disablement; (11) friction reduction by means such as low tension piston rings and roller cam followers; (12) higher temperature operation; and (13) other methods (specify).
 - k. Gasoline direct injection engines.
 - l. Naturally aspirated diesel engines, with direct or indirect fuel injection.
 - m. Turbocharged or supercharged diesel engines with direct or indirect fuel injection.
 - n. Stratified-charge reciprocating or rotary engines, with direct or indirect fuel injection.
 - o. Two cycle spark ignition engines.
 - p. Use of hybrid drivetrains
 - q. Use of fuel cells; provide a thorough description of the fuel cell technology employed, including fuel type and power output.
 - r. Other technologies for improving fuel economy or efficiency.
7. For each model of respondent's passenger car fleet, projected to be manufactured in each of MYs 2003-2012, describe the methods used to achieve reductions in average test

weight. For each specified model year and model, describe the extent to which each of the following methods for reducing vehicle weight will be used.

- a. Substitution of materials.
- b. "Downsizing" of existing vehicle design to reduce weight while maintaining interior roominess and comfort for passengers, and utility, i.e., the same or approximately the same, payload and cargo volume, using the same basic body configuration and driveline layout as current counterparts.
- c. Use of new vehicle body configuration concepts, which provides reduced weight for approximately the same payload and cargo volume.

8. Indicate any MY 2004-2012 passenger car model types that have higher average test weights than comparable MY 2003 model types. Describe the reasons for any weight increases (e.g., increased option content, less use of premium materials) and provide supporting justification.

9. For each new or redesigned vehicle identified in response to Question 3 and each new engine or fuel economy improvement identified in your response to Questions 3, 4, 5, and 6, provide your best estimate of the following, in terms of constant 2003 dollars:

- (a) Total capital costs required to implement the new/redesigned model or improvement according to the implementation schedules specified in your response. Subdivide the capital costs into tooling, facilities, launch, and engineering costs.
- (b) The maximum production capacity, expressed in units of capacity per year, associated with the capital expenditure in (a) above. Specify the number of production shifts on which your response is based and define "maximum capacity" as used in your answer.
- (c) The actual capacity that is planned to be used each year for each new/redesigned model or fuel economy improvement.
- (d) The increase in variable costs per affected unit, based on the production volume specified in (b) above.
- (e) The equivalent retail price increase per affected vehicle for each new/redesigned model or improvement. Provide an example describing methodology used to determine the equivalent retail price increase.

10. Please provide respondent's actual and projected U.S. passenger car sales, for each model year from 2003 to 2012, inclusive. Please subdivide the data into the following vehicle categories:

- i. Two-Seater Car (e.g., Chevrolet Corvette, Ford Thunderbird, Honda Insight)

- ii. Mini-compact Car (e.g., Audi TT Coupe, Lexus SC 300/430, Mitsubishi Eclipse Spyder)
- iii. Subcompact Car (e.g., Ford Mustang, Toyota Celica, Volkswagen New Beetle)
- iv. Compact Car (e.g., Chevrolet Cobalt, Dodge Neon, Ford Focus)
- v. Midsize Car (e.g., Chevrolet Malibu, Dodge Stratus, Honda Accord, Toyota Camry)
- vi. Large Car (e.g., Chevrolet Impala, Dodge Intrepid, Ford Crown Victoria)
- vii. Small Station Wagon (e.g., BMW 325 Sport Wagon, Subaru Impreza Wagon, Volkswagen Jetta Wagon)
- viii. Midsize Station Wagon (e.g., Ford Taurus Wagon, Saab 9-5 Wagon, Subaru Legacy Wagon)

See Table III-B for a sample format.

11. Please provide your estimates of projected total industry U.S. passenger car sales for each model year from 2003 through 2012, inclusive. Please subdivide the data into the vehicle categories listed in the sample format in Table III-C.

12. Please provide your company's assumptions for U.S. gasoline and diesel fuel prices during 2003 through 2012.

13. Please provide projected production capacity available for the North American market (at standard production rates) for each of your company's passenger carline designations during MYs 2003-2012.

14. Please provide your estimate of production lead time for new models, your expected model life in years, and the number of years over which tooling costs are amortized.

Note: The parenthetical numbers in Tables III-A through C refer to the items in Section III, Specifications.

Table III-A--Technology Improvements

Technological Improvement	Baseline Technology	Percent Fuel Economy Improvement, %	Basis for Improvement Estimate	Models on Which Technology is Applied	Production Share of Model With Technological Improvement				
					2003	2004	2005	2006	2007+
(6a.) Improved Auto Trans.									
LT-1		7.0			0	0	15	25	55
LT-2		6.5			0	0	0	20	25
LT-3		5.0			0	10	30	60	60
(6b) Improved Manual Trans.									
LV-1		1.0			2	5	5	5	5
U-1		0.7			0	0	0	8	10

Table III-B--Actual and Projected U.S. Passenger Car Sales

Apex Motors Passenger Car Sales Projections						
Model Line	Model Year					
	2003	2004	2005	2006	2007	2008+
Two-Seater	43,500					
Mini-compact Car	509,340					
Subcompact Car	120,000					
Compact Car	60,000					
Midsize Car	20,000					
Large Car	29,310					
Small Station Wagon	54,196					
Midsize Station Wagon	38,900					
Other (Specify)						
Total	TBD					

Table III-C--Total U.S. Passenger Car Sales

Model Type	2003	2004	2005	2006	2007	2008+
a. Two-Seater						
b. Mini-compact						
c. Subcompact						
d. Compact						
e. Midsize						
f. Large						
g. Small Station Wagon						
h. Midsize Station Wagon						
i. Other (Specify)						
Total Passenger Cars						

IV. Specifications – Light Truck Data

Go to www.nhtsa.dot.gov/cars/rules/CAFE/rulemaking.htm for spreadsheet templates.

1. Identify all light truck models currently offered for sale in MY 2003 whose production you project discontinuing before MY 2008 and identify the last model year in which each will be offered.

2. Identify all basic engines offered by respondent in MY 2003 light trucks which respondent projects it will cease to offer for sale in light trucks before MY 2008, and identify the last model year in which each will be offered.

3. For each model year 2003-2012, list all projected trucklines and provide the information specified below for each model type. Model types that are essentially identical except for their nameplates (e.g., Chrysler Town & Country/Dodge Caravan) may be combined into one item. Engines having the same displacement but belonging to different engine families are to be grouped separately. Within the fleet, the vehicles are to be sorted first by truckline, second by basic engine, and third by transmission type.

Spreadsheet templates can be found at

www.nhtsa.dot.gov/cars/rules/CAFE/rulemaking.htm. These templates include codes and definitions for the data that the Agency is seeking.

a. General Information

1. A unique identifying number or code assigned to each model.
2. Vehicle manufacturer.
3. Vehicle model (e.g., Camry)
4. Vehicle nameplate (e.g., Camry Solara)
5. Weighted average fuel economy
6. Engine code
 - A. Engine manufacturer
 - B. Engine name
 - C. Engine's country of origin
 - D. Fuel
 - E. Engine oil viscosity

- F. Combustion cycle
 - G. Air/fuel ratio
 - H. Fuel system
 - I. Aspiration
 - J. Valvetrain design
 - K. Valve actuation/timing
 - L. Valve lift
 - M. Number of engine cylinders
 - N. Configuration
 - O. Valves per cylinder
 - P. Cylinder deactivation
 - Q. Engine displacement
 - R. Compression ratio (Min)
 - S. Compression ratio (Max)
 - T. Horsepower
 - U. Torque
7. Transmission code
- A. Transmission manufacturer
 - B. Name of transmission
 - C. Transmission's country of origin
 - D. Transmission type
 - E. Number of forward gears
 - F. Control
 - G. Logic
 - H. Gear ratios for all forward gears
 - I. Reverse gear ratio
 - J. Torque converter ratio
 - K. Axle ratio
 - L. Torque converter lockup/bypass status
 - M. Transmission fluid specification
 - N. Transmission lubricant viscosity
- b. Projected U.S. sales
- c. Vehicle information

1. Style (e.g., pickup, van, utility)
2. EPA Size Class
3. Construction (e.g., unibody, ladder)
4. Drive (e.g., rear wheel drive, front wheel drive, all-wheel drive, 4-wheel drive)
5. Final drive ratio
6. N/V
7. Front axle lubricant viscosity
8. Rear axle lubricant viscosity
9. Overall length (per code L103 of SAE J1100, revised July 2002)
10. Overall width (per code W116 of SAE J1100, revised July 2002)
11. Overall height (per code H100 of SAE J1100, revised July 2002)
12. Wheelbase (per code L101 of SAE J1100, revised July 2002)
13. Track width (front) (per code W101-1 of SAE J1100, revised July 2002)
14. Track width (rear) (per code W101-2 of SAE J1100, revised July 2002)
15. Ground clearance (per 49 CFR 323.5)
16. Front axle clearance (per 49 CFR 323.5)
17. Rear axle clearance (per 49 CFR 323.5)
18. Angle of approach (per 49 CFR 323.5)
19. Breakover angle (per 49 CFR 323.5)
20. Angle of departure (per 49 CFR 323.5)
21. Height of the center of gravity (per NCAP Static Stability Factor procedures)
22. Curb weight, in lbs.
23. Test weight, in lbs.
24. Power absorption unit setting, in horsepower
25. Gross Vehicle Weight Rating, in lbs.
26. Towing capacity (standard), in lbs.
27. Towing capacity (maximum), in lbs.
28. Payload, in lbs.
29. Minimum designated seating positions
30. Maximum designated seating positions
31. Designated seating positions in the first row

32. Cargo volume behind the front row in ft³ (per Table 28 of SAE J1100, revised July 2002)
 33. Designated seating positions in the second row
 34. Capability of second row seats to fold flat
 35. Cargo volume behind the second row in ft³ (per Table 28 of SAE J1100, revised July 2002)
 36. Designated seating positions in the third row
 37. Capability of third row seats to fold flat
 38. Cargo volume behind the third row in ft³ (per Table 28 of SAE J1100, revised July 2002)
 39. Enclosed volume in ft³
 40. Passenger volume in ft³ (The volume measured using SAE Recommended Practice J1100 as per EPA Fuel economy regulations, reg. 40 CFR 600.315-82 "Classes of Comparable Automobiles." This number is what automobile manufacturers calculate and submit to EPA.)
 41. Cargo volume index (per Table 28 of SAE J1100, revised July 2002)
 42. Open box length (per L506 of SAE J1100, revised July 2002)
 43. Open box width (min) (per W201 of SAE J1100, revised July 2002)
 44. Open box width (max) (per W500 of SAE J1100, revised July 2002)
 45. Open box area
 46. Open box height (per H503 of SAE J1100, revised July 2002)
 47. Fuel capacity in gallons
 48. Tire rolling resistance, Crr
 49. Frontal area
 50. Aerodynamic drag coefficient, Cd
- d. Hybridization
1. Type
 2. Voltage or pressure
 3. Energy storage capacity, in MJ
 4. Battery type
 5. Energy transfer
 6. Percentage of braking energy recovered and stored
 7. Percentage of maximum motive power provided by stored energy system

e. Planning and assembly

1. Predecessor model
2. Last freshening
3. Next freshening
4. Last redesign
5. Next redesign
6. Domestic content
7. Final assembly city
8. Final assembly state
9. Final assembly country

f. Manufacturers' suggested retail price (in constant 2003 dollars)

g. Emissions

1. EPA class (LDV, LLDT, HLDT, MDPV)
2. EPA certification bin
3. LEV class

The agency also requests that each manufacturer provide an estimate of its overall light truck CAFE for each model year. This estimate should be included as an entry in the spreadsheets that are submitted to the agency.

4. Does respondent project introducing any variants of existing basic engines or any new basic engines, other than those mentioned in your response to Question 3, in its light truck fleets in MYs 2003-2012? If so, for each basic engine or variant indicate:

- a. The projected year of introduction,
- b. Type (e.g., spark ignition, direct injection diesel, 2-cycle, alternative fuel use),
- c. Displacement (If engine has variable displacement, please provide the minimum and maximum displacement),
- d. Type of induction system (e.g., fuel injection with turbocharger, naturally aspirated),
- e. Cylinder configuration (e.g., V-8, V-6, I-4),
- f. Number of valves per cylinder (e.g., 2, 3, 4),
- g. Valvetrain design (e.g., overhead valve, overhead camshaft),

- h. Valve technology (e.g., variable valve timing, variable valve lift and timing, intake valve throttling, camless valve actuation, etc.)
 - i. Horsepower and torque ratings,
 - j. Models in which engines are to be used, giving the introduction model year for each model if different from "a," above.
5. Relative to MY 2003 levels, for MYs 2005-2012, please provide information, by truckline and as an average effect on a manufacturer's entire light truck fleet, on the weight and/or fuel economy impacts of the following standards or equipment:
- a. Federal Motor Vehicle Safety Standard (FMVSS 208) Automatic Restraints
 - b. FMVSS 201 Occupant Protection in Interior Impact
 - c. Voluntary installation of safety equipment (e.g., antilock brakes)
 - d. Environmental Protection Agency regulations
 - e. California Air Resources Board requirements
 - f. Other applicable motor vehicle regulations affecting fuel economy.
6. For each of the model years 2003-2012, and for each light truck model projected to be manufactured by respondent (if answers differ for the various models), provide the requested information on new technology applications for each of items "6a" through "6f" listed below:
- (i) description of the nature of the technological improvement;
 - (ii) the percent fuel economy improvement averaged over the model;
 - (iii) the basis for your answer to 6(ii), (e.g., data from dynamometer tests conducted by respondent, engineering analysis, computer simulation, reports of test by others);
 - (iv) the percent production implementation rate and the reasons limiting the implementation rate;
 - (v) a description of the 2003 baseline technologies and the 2003 implementation rate; and

(vi) the reasons for differing answers you provide to items (ii) and (iv) for different models in each model year. Include as a part of your answer to 6(ii) and 6(iv) a tabular presentation, a sample portion of which is shown in Table IV-A.

- a. Improved automatic transmissions. Projections of percent fuel economy improvements should include benefits of lock-up or bypassed torque converters, electronic control of shift points and torque converter lock-up, and other measures which should be described.
- b. Improved manual transmissions. Projections of percent of fuel economy improvement should include the benefits of increasing mechanical efficiency, using improved transmission lubricants, and other measures (specify).
- c. Overdrive transmissions. If not covered in "a" or "b" above, project the percentage of fuel economy improvement attributable to overdrive transmissions (integral or auxiliary gear boxes), two-speed axles, or other similar devices intended to increase the range of available gear ratios. Describe the devices to be used and the application by model, engine, axle ratio, etc.
- d. Use of engine crankcase lubricants of lower viscosity or with additives to improve friction characteristics or accelerate engine break-in, or otherwise improved lubricants to lower engine friction horsepower. When describing the 2002 baseline, specify the viscosity of and any fuel economy-improving additives used in the factory-fill lubricants.
- e. Reduction of engine parasitic losses through improvement of engine-driven accessories or accessory drives. Typical engine-driven accessories include water pump, cooling fan, alternator, power steering pump, air conditioning compressor, and vacuum pump.
- f. Reduction of tire rolling losses, through changes in inflation pressure, use of materials or constructions with less hysteresis, geometry changes (e.g., reduced aspect ratio),

reduction in sidewall and tread deflection, and other methods. When describing the 2002 baseline, include a description of the tire types used and the percent usage rate of each type.

g. Reduction in other driveline losses, including losses in the non-powered wheels, the differential assembly, wheel bearings, universal joints, brake drag losses, use of improved lubricants in the differential and wheel bearing, and optimizing suspension geometry

(e.g., to minimize tire scrubbing loss).

h. Reduction of aerodynamic drag.

i. Turbocharging or supercharging.

j. Improvements in the efficiency of 4-cycle spark ignition engines including (1) increased compression ratio; (2) leaner air-to-fuel ratio; (3) revised combustion chamber configuration; (4) fuel injection; (5) electronic fuel metering; (6) interactive electronic control of engine operating parameters (spark advance, exhaust gas recirculation, air-to-fuel ratio); (8) variable valve timing or valve lift; (9) multiple valves per cylinder; (10) cylinder deactivation; (11) friction reduction by means such as low tension piston rings and roller cam followers; (12) higher temperature operation; and (13) other methods (specify).

k. Direct injection gasoline engines.

l. Naturally aspirated diesel engines, with direct or indirect fuel injection.

m. Turbocharged or supercharged diesel engines with direct or indirect fuel injection.

n. Stratified-charge reciprocating or rotary engines, with direct or indirect fuel injection.

o. Two cycle spark ignition engines.

p. Use of hybrid drivetrains

q. Use of fuel cells; provide a thorough description of the fuel cell technology employed, including fuel type and power output.

- r. Other technologies for improving fuel economy or efficiency.
7. For each model of respondent's light truck fleet projected to be manufactured in each of MYs 2003-2012, describe the methods used to achieve reductions in average test weight. For each specified model year and model, describe the extent to which each of the following methods for reducing vehicle weight will be used. Separate listings are to be used for 4x2 light trucks and 4x4 light trucks.
- a. Substitution of materials.
 - b. "Downsizing" of existing vehicle design to reduce weight while maintaining interior roominess and comfort for passengers, and utility, i.e., the same or approximately the same, payload and cargo volume, using the same basic body configuration and driveline layout as current counterparts.
 - c. Use of new vehicle body configuration concepts, which provides reduced weight for approximately the same payload and cargo volume.
8. Indicate any MY 2003-2012 light truck model types that have higher average test weights than comparable MY 2002 model types. Describe the reasons for any weight increases (e.g., increased option content, less use of premium materials) and provide supporting justification.
9. For each new or redesigned vehicle identified in response to Question 3 and each new engine or fuel economy improvement identified in your response to Questions 3, 4, 5, and 6, provide your best estimate of the following, in terms of constant 2003 dollars:
- (a) Total capital costs required to implement the new/redesigned model or improvement according to the implementation schedules specified in your response. Subdivide the capital costs into tooling, facilities, launch, and engineering costs.

(b) The maximum production capacity, expressed in units of capacity per year, associated with the capital expenditure in (a) above. Specify the number of production shifts on which your response is based and define "maximum capacity" as used in your answer.

(c) The actual capacity that is planned to be used each year for each new/redesigned model or fuel economy improvement.

(d) The increase in variable costs per affected unit, based on the production volume specified in (b) above.

(e) The equivalent retail price increase per affected vehicle for each new/redesigned model or improvement. Provide an example describing methodology used to determine the equivalent retail price increase.

10. Please provide respondent's actual and projected U.S. light truck sales, 4x2 and 4x4, 0-8,500 lbs. GVWR and 8501-10,000 lbs., GVWR for each model year from 2002 through 2004, inclusive. Please subdivide the data into the following vehicle categories:

- i. Standard Pickup Heavy (e.g., C2500/3500, F-250/350)
- ii. Standard Pickup Light (e.g., C1500, F-150)
- iii. Compact Pickup (e.g., S-10, Ranger, Dakota)
- iv. Standard Cargo Vans Heavy (e.g., G3500, E-250/350)
- v. Standard Cargo Vans Light (e.g., G1500/2500, E-150)
- vi. Standard Passenger Vans Heavy (e.g., G3500, E-250/350)
- vii. Standard Passenger Vans Light (e.g., G1500/2500, E-150)
- viii. Compact Cargo Vans (e.g., Astro/Safari)
- ix. Compact Passenger Vans (e.g., Sienna, Odyssey, Caravan)
- x. Full-size Sport Utilities (e.g., Tahoe, Expedition, Sequoia)
- xi. Mid-size Sport Utilities (e.g., Trailblazer, Explorer)
- xii. Compact Utilities (e.g., Wrangler, RAV4)

xiii. Crossover Vehicle (e.g., Pacifica, Rendezvous, RX 330)

xiv. Other (e.g., Avalanche)

See Table IV-B for a sample format.

11. Please provide your estimates of projected total industry U.S. light (0-10,000 lbs, GVWR) truck sales for each model year from 2003 through 2012, inclusive. Please subdivide the data into 4x2 and 4x4 sales and into the vehicle categories listed in the sample format in Table IV-C.

12. Please provide your company's assumptions for U.S. gasoline and diesel fuel prices during 2003 through 2012.

13. Please provide projected production capacity available for the North American market (at standard production rates) for each of your company's light truckline designations during MYs 2003-2012.

14. Please provide your estimate of production lead-time for new models, your expected model life in years, and the number of years over which tooling costs are amortized.

Note: The parenthetical numbers in Tables IV-A refer to the items in Section IV, Specifications.

Table IV-A--Technology Improvements

Technological Improvement	Baseline Technology	Percent Fuel Economy Improvement, %	Basis for Improvement Estimate	Models on Which Technology is Applied	Production Share of Model With Technological Improvement				
					2003	2004	2005	2006	2007+
(6a.) Improved Auto Trans.									
LT-1		7.0			0	0	15	25	55
LT-2		6.5			0	0	0	20	25
LT-3		5.0			0	10	30	60	60
(6b) Improved Manual Trans.									
LV-1		1.0			2	5	5	5	5
U-1		0.7			0	0	0	8	10

Table IV-B--Actual and Projected U.S. Light Truck Sales

Amalgamated Motors Light Truck Sales Projections						
Model Line	Model Year					
	2003	2004	2005	2006	2007	2008+
Compact Pickup	43,500					
Standard Pickup - Light	209,340					
Standard Pickup - Heavy	120,000					
Compact Cargo Van	60,000					
Standard Cargo Van - Light	20,000					
Standard Cargo Van - Heavy	29,310					
Compact Passenger Van/Minivan	54,196					
Standard Passenger Van - Light	38,900					
Standard Passenger Van - Heavy						
Compact Sport Utility						
Mid-Size Sport Utility						
Full-size Sport Utility						
Crossover Vehicle						
Other (Specify)						
Total	TBD					

Table IV-C--Total U.S. Light Truck Sales

Model Type	2003	2004	2005	2006	2007	2008+
Compact Pickup						
Standard Pickup - Light						
Standard Pickup - Heavy						
Compact Cargo Van						
Standard Cargo Van – Light						
Standard Cargo Van – Heavy						
Compact Passenger Van/Minivan						
Standard Passenger Van – Light						
Standard Passenger Van – Heavy						
Compact Sport Utility						
Mid-Size Sport Utility						
Full-size Sport Utility						
Crossover Vehicle						
Other (Specify)						
Total						